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## ENVIRONMENTAL LAW

# Clean Coal: Is Carbon Sequestration Coming to Pa.?

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*Special to the Legal*

The potential stakes associated with clean coal technology are evidenced by the intensity of the media campaigns launched by various interested parties. On one side, there is the American Coalition for Clean Coal Electricity, whose members include various industrial concerns, producing ads that emphasize that coal-fired power plants provide 50 percent of the electricity consumed in the United States, and thus clean coal technology is the key to addressing climate change without disastrous economic consequences. On the other side, you have the “Reality Coalition,” whose members include various environmental groups, challenging the viability of clean coal through a satirical ad where a salesman sprays a “clean coal” product through a suburban home leaving all its occupants covered in soot.

TV-friendly rhetoric aside, it is clear that the potential of clean coal technology has captured the attention of lawmakers and regulators in Washington, D.C., Harrisburg and other states. Pennsylvania in particular, with its long history as a “coal state,” is attempting to become a leader in the commercial deployment of technology that captures the CO<sub>2</sub> emissions from coal-fired power plants and permanently stores the emissions in below-ground geologic formations.

While the basic technology, called carbon capture and sequestration, or CCS, has been used for decades in enhanced oil recovery operations, the use of CCS to control emissions from power plants and other industrial operations presents a number of new technical, economic, legal and regulatory issues that will need to be settled in conjunction with any efforts to include CCS as part of a comprehensive plan to address climate change. The balance of this article outlines some of the major legal and regulatory issues associated with the use of CCS and describes some recent efforts to promote the development of CCS within the commonwealth.

### WHAT IS CCS?

The CCS process consists of three basic stages: capture and compression of CO<sub>2</sub> emissions at the source; transport of the CO<sub>2</sub>



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emission stream via pipeline to a storage site; and injection into and storage in the storage formation. CO<sub>2</sub> can be captured either pre-combustion using Integrated Gasification Combined Cycle technology (which has yet to be applied on a commercial scale) or post-combustion.

After the CO<sub>2</sub> is captured, it is compressed until it becomes a “supercritical liquid.” This supercritical liquid stream is transported via pipeline to the storage site, where it is injected into an appropriate geological formation for permanent storage. The storage area must be at least 2,500 feet below ground to maintain the pressure necessary for the CO<sub>2</sub> to remain in the supercritical state. There are currently three basic formations where CO<sub>2</sub> is expected to be injected: unused oil and gas wells; unmineable coal seams; and deep saline groundwater formations.

As noted previously, the capture, transport and subsurface injection of CO<sub>2</sub> for commercial purposes is not new — oil and gas companies have been using injected CO<sub>2</sub> for purposes of enhanced oil recovery for more than 30 years. Accordingly, there is an existing legal and regulatory framework surrounding the transport and injection of CO<sub>2</sub> into the subsurface. At the same time, however, the amount of CO<sub>2</sub> to be injected for CCS purposes is expected to be much greater than the amount currently used for enhanced oil recovery, and the goal of CCS (i.e., permanent storage of large quantities of CO<sub>2</sub>) is not necessarily the focus of enhanced oil recovery. Thus, it is widely understood that a number of legal and regulatory challenges

will need to be addressed before CCS can be viewed as commercially viable.

### REGULATORY ISSUES

To address some of the new issues raised by CCS, there have been calls for a new broad federal regulatory framework. For now, the U.S. Environmental Protection Agency has chosen to begin to develop a CCS regulatory program using its authority under the Safe Drinking Water Act to regulate underground injection wells to protect drinking water sources. Under this authority, the EPA last year proposed revisions to its Underground Injection Control program that would provide minimum standards for injection wells used for geologic sequestration. The proposed rule included standards for siting, well construction, monitoring, well closure, post-closure care and financial assurance. The comment period for the proposed rule closed in November 2008, but a multi-stakeholder group of energy companies, oil companies, environmental groups and other interested entities has been engaged in ongoing discussions in an effort to reach consensus on specific recommendations. The EPA has said that they plan to issue a final rule in late 2010 or early 2011.

One important regulatory issue that the EPA’s proposed injection rule declined to address was the status of the CO<sub>2</sub> stream with respect to federal and state waste disposal regulations. In a joint letter from Pennsylvania’s Department of Environmental Protection, or DEP, and the Department of Conservation and Natural Resources, or DCNR, commenting on the EPA’s proposed rule, the DEP asserted that sequestered CO<sub>2</sub> constituted a “residual waste” under Pennsylvania’s Solid Waste Management Act, or SWMA, if it did not otherwise qualify as a hazardous waste, thereby implicating additional state waste permitting and regulatory requirements.

Similarly, the EPA’s proposed injection rule explicitly refused to state whether an injected CO<sub>2</sub> stream should categorically be considered a “hazardous substance” under the Comprehensive Environmental Response Compensation and Liability Act (aka Superfund). If an injected CO<sub>2</sub> stream was considered a “hazardous substance” under

Superfund, then it raises the prospect of joint and several liability and other cost recovery options for instances where CCS results in unanticipated contamination of subsurface resources.

The potential promulgation of federal regulations applicable to CCS has not stopped individual states from pursuing their own regulations. Indeed, Pennsylvania, as described in more detail below, may be on a path to promulgate its own CCS regulatory framework.

**PROPERTY RIGHTS**

The development of commercial scale CCS necessarily implicates fundamental and oftentimes thorny issues related to property rights, specifically who owns the pore space in which CO<sub>2</sub> will be stored. Some states have chosen to address the property rights issue by statute, vesting pore space rights either with the surface owner or with the mineral rights holder. In Pennsylvania, however, many of these issues must be addressed through application of a complex body of law concerning surface and subsurface rights that relies upon judicial decisions that date back to the beginning of commercial oil exploration in Pennsylvania in the mid-19th century.

Like most states, Pennsylvania law allows persons to transfer subsurface rights to others, and thus with respect to questions about pore space ownership, there will invariably be questions as to how a prior transfer of mineral or other subsurface rights affects the right to use pore space for CCS. Moreover, it is unclear how Pennsylvania’s “rule of capture,” which vests ownership rights in certain resources upon capture of those resources, could affect pore space issues.

**TORT LIABILITY**

The capture, transport and sequestration of CO<sub>2</sub> carries additional risks to human health and the environment other than those associated with direct contamination of drinking water supplies. These include the mobilization of metals into drinking water supplies, catastrophic releases of CO<sub>2</sub> to the atmosphere in amounts that can result in asphyxiation, less than catastrophic releases that could result in harm to the surrounding ecosystem (including increasing the amount of global warming gases in the atmosphere) and increases in seismic activity such as earthquakes, ground heave or subsidence. Aside from regulations, a number of common law tort theories could be used to redress injuries related to these risks. For example, trespass could be used where injected CO<sub>2</sub> unexpectedly crosses property lines. Similarly, nuisance claims could be pursued where CCS activities unreasonably interfere with the use of a drinking water well or an oil or gas well. In addition, theories of negligence or even strict liability could be pursued

in instances where CCS activities resulted in some type of harm.

This risk of tort liability over the potentially thousands of years CO<sub>2</sub> is to be stored underground is often cited as one of the major hurdles for commercial scale CCS development. Some states, in an effort to lure CCS projects, have enacted statutes that release CCS operators from liability after a defined period of time. Others have pushed for a combination of financial assurance mechanisms, such as insurance, plus comprehensive federal legislation that establishes liability limits and a liability fund administered by the government, akin to what is done for nuclear power operation under the Price-Anderson Act.

**FEDERAL INCENTIVES**

Another challenge facing the development of CCS is economic — the technology associated with commercial-scale CCS is currently unproven and very expensive. To help with this issue, the federal government has enacted or is considering a number of programs to provide funding to companies that are willing to conduct research and pilot testing related to CCS. For example, the American Recovery and Reinvestment Act

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*Pennsylvania is attempting to become a leader in the commercial deployment of technology that captures the CO<sub>2</sub> emissions from coal-fired power plants and permanently stores the emissions in below-ground geologic formations.*

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of 2009 directs \$3.4 billion of stimulus funds toward CCS research. In addition, there are a number of bills pending in Congress that would provide additional billions toward CCS research, including legislation introduced by Sen. Robert P. Casey Jr. that would provide \$3.8 billion between 2010 and 2013. Another pending bill would provide liability protection for up to 10 commercial scale CCS projects.

**PENNSYLVANIA EFFORTS**

Lawmakers and officials in Harrisburg have been particularly focused on efforts to make Pennsylvania a worldwide leader in the

development of commercial scale CCS operations. In 2006, DCNR created a Carbon Management Advisory Group, which in 2008 issued a report summarizing expert opinion and stakeholders input on policy options and other issues related to, among other things, CCS.

Also in 2008, Pennsylvania enacted Act 129, which included provisions that require DCNR to conduct two assessments related to CCS in Pennsylvania. The first report, released by DCNR in May, identified four geologic formations in Pennsylvania potentially suitable for CO<sub>2</sub> sequestration. Based on the conclusions of this report, DCNR is scheduled to begin “thumping” roads to collect additional seismic data from these areas. The second report required by Act 129 is due Nov. 1, and is supposed to evaluate a number of the open technical and legal issues discussed previously, including risks to the environment and the potential costs of CCS.

In addition, there are two bills pending in the General Assembly (SB 92 and HB 80) that would amend Pennsylvania’s Alternative Energy Portfolio Standard to require that 3 percent of all electricity sold in Pennsylvania starting in 2015 come from coal-fired power plants that capture and sequester a specified percentage of CO<sub>2</sub> emissions. The original bills attempted to avoid many of the issues surrounding CCS by establishing a CCS network only on state-owned lands. However, an amended version of HB 80, introduced earlier this week, allows for the sequestration facilities under private lands. These private sequestration facilities would be permitted by DEP and subject to regulations promulgated by the Environmental Quality Board that would include, among other things, fees imposed upon the sequestration facility. With respect to liability, the CO<sub>2</sub> generating facilities would receive immunity once the CO<sub>2</sub> was transferred to the sequestration facility. After “final” closure of the sequestration facility and payment of all fees, the commonwealth would assume liability for ongoing care of and any releases from the sequestration facility. Any costs incurred by the commonwealth would be paid from a fund established through the fees paid by the sequestration facilities.

In conclusion, the development of commercial-scale CCS as a means to address climate change will undoubtedly continue to receive attention from many sides, especially with respect to a number of open legal and regulatory issues. While the ultimate outcome of those issues is somewhat uncertain, it appears that Pennsylvania hopes to be a major player when it comes to CCS. •

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